Chapter 1

Introduction

1.1 The Need for Aviation System Capacity Improvement

In 1993, 23 airports each exceeded 20,000 hours of annual flight delays. With an average aircraft operating cost of about $1,600 per hour of delay,[1] this means that each of these 23 airports incurred at least $32 million dollars in annual delay costs. By 2003, the number of airports that will exceed 20,000 hours of annual delay is projected to grow from 23 to 32, unless capacity improvements are made.[2] The purpose of this plan is to identify and facilitate actions that can be taken to prevent the projected growth in delays. These actions include:

- Airport Development.
- New Air Traffic Control Procedures.
- Airspace Development.
- New Technology.
- Marketplace Solutions.

In 1993, 23 airports exceeded 20,000 hours of annual flight delays. By 2003, the number of airports that will exceed 20,000 hours of annual delay is projected to grow to 32, unless capacity improvements are made.

For three consecutive years, the number of flights exceeding 15 minutes of delay has declined. After a decrease of just over 24 percent from 1990 to 1991, flights exceeding 15 minutes of delay decreased nearly 6 percent in 1992 compared to 1991 and nearly 2 percent in 1993 compared to 1992. The forecast for 32 airports exceeding 20,000 hours of annual delay in 2003 is eight less than the 40 airports predicted three years ago for the year 2000. These and other delay statistics reflect three years of declining or almost static aviation activity.

In the United States, economic growth has averaged only 1.9 percent annually during the 1990s, a period that included a three-quarter economic recession in 1990 and 1991. The slow pace of the economic recovery in this country and economic re-

1. The actual average aircraft operating cost is $1,587 per hour. The cost for heavy aircraft 300,000 lbs. or more is $4,575 per hour of delay, large aircraft under 300,000 lbs. and small jets, $1,607 per hour, and single-engine and twin-engine aircraft under 12,500 lbs., $42 and $124 per hour respectively. These figures are based on 1987 dollars, the latest data available.
2. For a listing of airports exceeding 20,000 hours of annual delay, see Table 1-4 and Figure 1-5.

cessions in several major world trade areas have had a significant impact on the demand for aviation services. Commercial air carrier domestic passenger enplanements have increased at an annual rate of only 0.8 percent during the last four years.

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Yet, even with overall demand for air travel relatively static, demand at the most congested airports remained high. The same 23 airports have experienced over 20,000 hours of annual aircraft flight delays since 1990. As the economy continues to recover, the demand for air travel will grow. As the number of aircraft operations increases to meet that demand, the level of delay will increase concurrently unless improvements are made to system capacity.

Over the next twelve years, the economy is expected to rebound and sustain a moderate rate of growth averaging 2.6 percent.[3] Gross domestic product (GDP) is a significant indicator of business activity, which, in turn, drives aviation activity. Figure 1-1 illustrates the historical growth in GDP and commercial air carrier domestic passenger enplanements since 1965 and the anticipated growth through 2005.

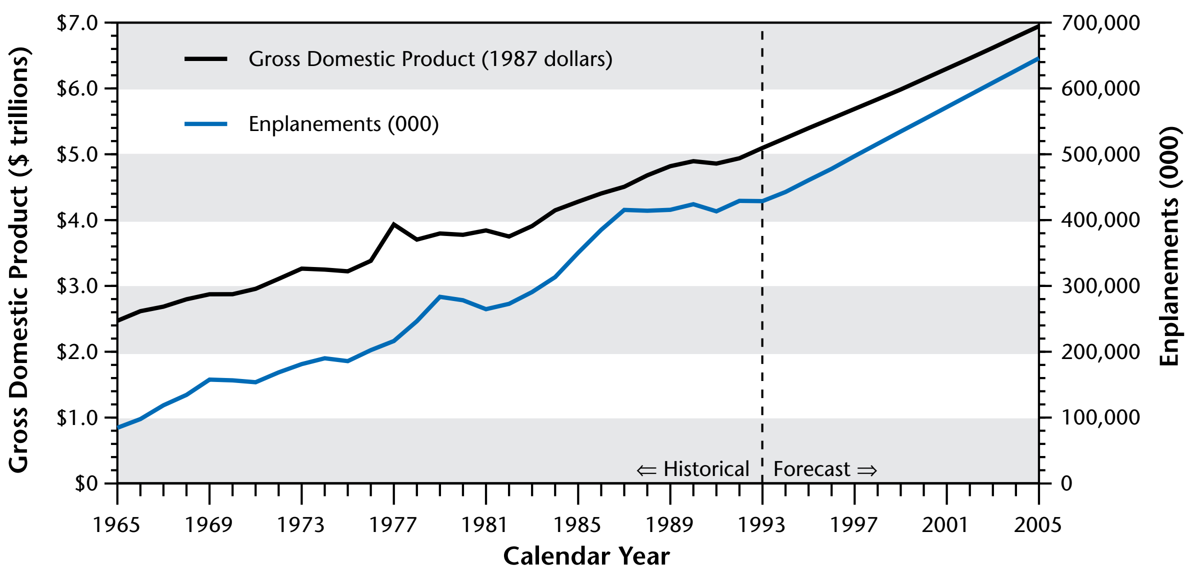

Figure 1-1. Growth in Gross Domestic Product and Domestic Passenger Enplanements, 1965 to 2005

According to FAA aviation forecasts,[3] air carrier domestic passenger enplanements are expected to increase at an average annual rate of 3.5 percent between 1994 and 2005, and domestic air carrier aircraft operations are forecast to increase at an average annual rate of 1.9 percent during the same twelve-year period. The higher growth predicted for passenger enplanements relative to aircraft activity is the result of significantly higher load factors, larger seating capacity for air carrier aircraft, and longer passenger trip lengths. International air carrier passenger enplanements are forecast to increase at an annual rate of 6.5 percent, and regional/commuter airline passenger enplanements are expected to grow 6.9 percent annually.

According to FAA aviation forecasts, air carrier domestic passenger enplanements are expected to increase at an average annual rate of 3.5 percent between 1994 and 2005, and domestic air carrier aircraft operations are forecast to increase at an average annual rate of 1.9 percent.

Although the current delay forecasts continue to project serious delays in the absence of capacity improvements, the message contained in succeeding chapters is positive. For example, a great deal is being done to improve capacity and reduce delays through new construction projects at airports and recent enhancements in Air Traffic Control (ATC) procedures. Airspace capacity design projects are being undertaken to study the terminal airspace associated with delay-impacted airports across the country. In addition, there are many emerging technologies in the areas of surveillance, communications, and navigation that will further improve the efficiency of new and existing runways and of terminal and en route airspace.

In fact, these capacity-producing improvements are frequently interrelated; changes in one often require changes in the others before all the potential capacity benefits can be realized. Resolving the problem of delay requires an integrated approach that develops capacity improvements throughout the aviation system, while at the same time maintaining or improving the current level of aviation safety. Improvements in capacity — constructing new runways and taxiways, installing enhanced facilities and equipment, applying new technologies — generally require long lead times. We must start preparing now for improvements that take 5 to 10 years to plan, develop, and implement.

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3. *FAA Aviation Forecasts, Fiscal Years 1994–2005*, FAA–APO 94–1, March 1994. The economic scenario used to develop the FAA Aviation Forecasts for the period 1994 through 1999 was provided by the Executive Office of the President, Office of Management and Budget (OMB). For the period from 2000 through 2005, the economic scenario used consensus growth rates of the economic variables, based on forecasts prepared by DRI/McGraw-Hill, Evans Econometrics, and the WEFA Group.

1.2 Aviation Capacity Enhancement Plan

The *Aviation Capacity Enhancement Plan* is an important part of Federal Aviation Administration (FAA) and Department of Transportation (DOT) efforts to improve the Nation's transportation system.

The *Aviation Capacity Enhancement Plan* supports the key strategic issue of improving capacity and access.

The *Aviation Capacity Enhancement Plan* identifies the causes of delay and quantifies its magnitude.

The *Aviation Capacity Enhancement Plan* is an important part of Federal Aviation Administration (FAA) and Department of Transportation (DOT) efforts to improve the Nation's transportation system. The Secretary of Transportation's *National Transportation Policy* (NTP) describes the enormity of the Nation's transportation infrastructure needs and sets as a major theme the need to maintain and expand the national transportation system. The *Federal Aviation Administration Strategic Plan*, based on the NTP, provides the long-term goals and objectives towards which the FAA is working. The newly developed FAA Operational Concept bridges the gap between the broad policies and strategies of the FAA Strategic Plan and the specific actions and projects in the numerous operating-level plans throughout the FAA. The FAA Operational Concept delineates the operational capabilities that must be in place to achieve an operating vision of the future for the year 2010. The *Aviation Capacity Enhancement Plan* supports the key strategic issue of improving capacity and access.

The *Aviation Capacity Enhancement Plan* is also linked to other FAA operating-level plans. In particular, it addresses requirements for research, for facilities and equipment, and for airport improvements that can be funded from the FAA's *Airport Improvement Program* (AIP). Each of these areas is addressed in a major FAA plan, and the *Aviation Capacity Enhancement Plan* generates requirements for each of those plans. *The Research, Engineering, and Development (RE&D) Plan* is used to determine which systems and technologies the FAA should use to accomplish agency goals and objectives. The RE&D Plan includes the research needed to validate the new instrument approach procedures detailed in Chapter 3. The *Capital Investment Plan* (CIP) provides a framework for investment in the facilities and equipment needed to improve the National Airspace System (NAS). The CIP funds the technological improvements described in Chapter 5. The *National Plan of Integrated Airport Systems* (NPIAS) presents airport improvement projects nationwide that are eligible for AIP funding. Among these are projects to build new airports and to improve existing airports to increase capacity and safety. These projects are discussed in Chapter 2.

The *Aviation Capacity Enhancement Plan* identifies the causes of delay and quantifies its magnitude. The plan catalogues and summarizes programs that have the potential to enhance capacity and reduce delay. Within the plan, these programs have been organized into broadly related categories that, in turn, parallel chapter development: Airport Development, New Instrument Approach Procedures, Airspace Development, Technology for Capacity Improvement, and Marketplace Solutions.

1.3 Level of Aviation Activity

1.3.1 Activity Statistics at the Top 100 Airports

The top 100 airports in the United States, as measured by 1992 passenger enplanements, are shown in Figure 1-2.[4] These 100 airports accounted for over 92 percent of the 514.2 million passengers that enplaned nationally in 1992.

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In 2005, 775 million domestic and international passengers are forecast to enplane at these airports.[5] This represents a projected growth in enplanements of nearly 64 percent over the 13 year period of the forecast, an average annual rate of growth of about 5 percent.

In 1992, over 25 million aircraft operations occurred at the top 100 airports. By 2005, operations are forecast to grow to approximately 35 million at these airports, a projected growth in operations of nearly 38 percent.

Operations data for 1991, 1992, and 1993 and enplanement data for 1991 and 1992, as well as forecasts of operations and enplanements for 2005 for the top 100 airports, are included in Appendix A.

4. The top 100 airports were chosen based on 1992 passenger enplanements as listed in preliminary data intended for the FAA's annual report, *Terminal Area Forecasts*.

5. Based on preliminary data intended for the FAA's *Terminal Area Forecasts*. FY91 and FY92 operations and enplanement data for the top 100 airports, a forecast for the year 2005, and the percentage growth that the forecast represents are shown in Appendix A, as well as a ranking by percentage growth in operations and enplanements.

1.3.2 Traffic Volumes in Air Route Traffic Control Centers (ARTCCS)

In 1992, the total number of aircraft flying under IFR handled by all ARTCCs increased, but only by 0.8 percent compared to 1991, from 36.4 up to 36.7 million operations.

Center operations are forecast to increase from 36.7 million aircraft handled in 1992 to 46.5 million in 2005.

Air traffic volume statistics for 1992 show that instrument flight rules (IFR) operations increased at 11 of the 20 Continental United States (CONUS) ARTCCs over 1991. In 1992, the total number of aircraft flying under IFR handled by all ARTCCs increased, but only by 0.8 percent compared to 1991, from 36.4 up to 36.7 million operations.[6] Commercial aircraft handled at the centers increased by 1.3 percent, with commuter/air taxi activity up 5.4 percent, while general aviation and military activity remained static.

Aircraft operations at the centers are expected to grow at an average rate of 2.0 percent a year between 1992 and 2005.[7] In absolute numbers, center operations are forecast to increase from 36.7 million aircraft handled in 1992 to 46.5 million in 2005. In 1992, 49.9 percent of the traffic handled at centers were air carrier flights. This proportion is expected to increase only slightly to 51.4 percent in 2005.

Figure 1-3 provides a map of the 20 CONUS ARTCCs. Figure 1-4 compares the number of operations during FY91 and FY92 and provides a forecast for FY05 for each of the 20 CONUS ARTCCs. A breakdown by user group of the traffic handled by the centers in 1991 and 1992, operations data for the individual ARTCCs for 1991 and 1992, and forecasts for 2005 are included in Appendix A.

6. Based on FAA's Forecast of IFR Aircraft Handled by Air Route Traffic Control Centers 1993–2005, FAA-APO-93-4, May 1993.

7. Based on *FAA Aviation Forecasts, Fiscal Years 1994–2005*, FAA–APO 94–1, March 1994.

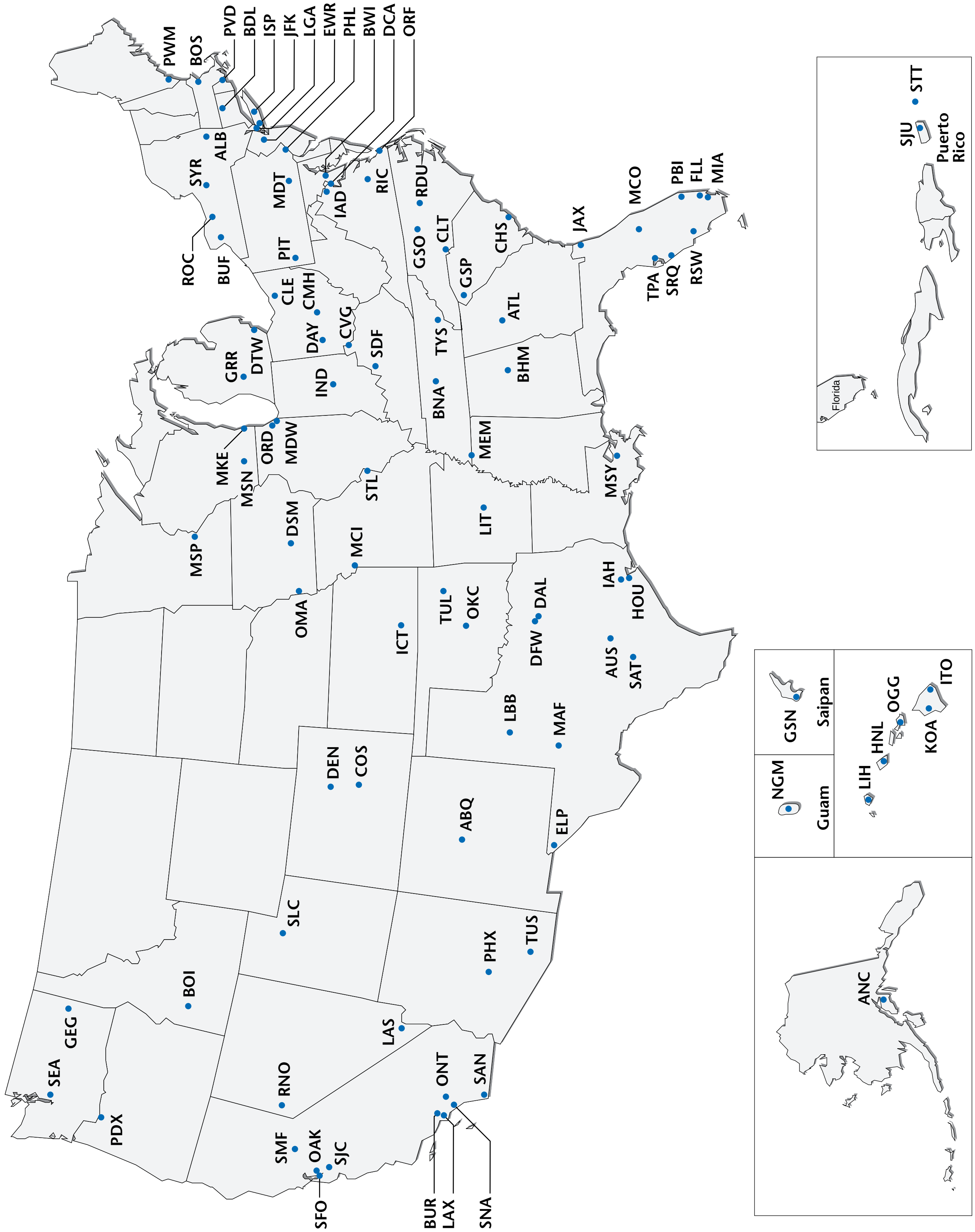


Figure 1-2. The Top 100 Airports by 1992 Enplanements

Source: FAA'S Terminal Area Forecasts

See Table A-6 in Appendix A for an alphabetic listing of the three-letter airport identifiers.

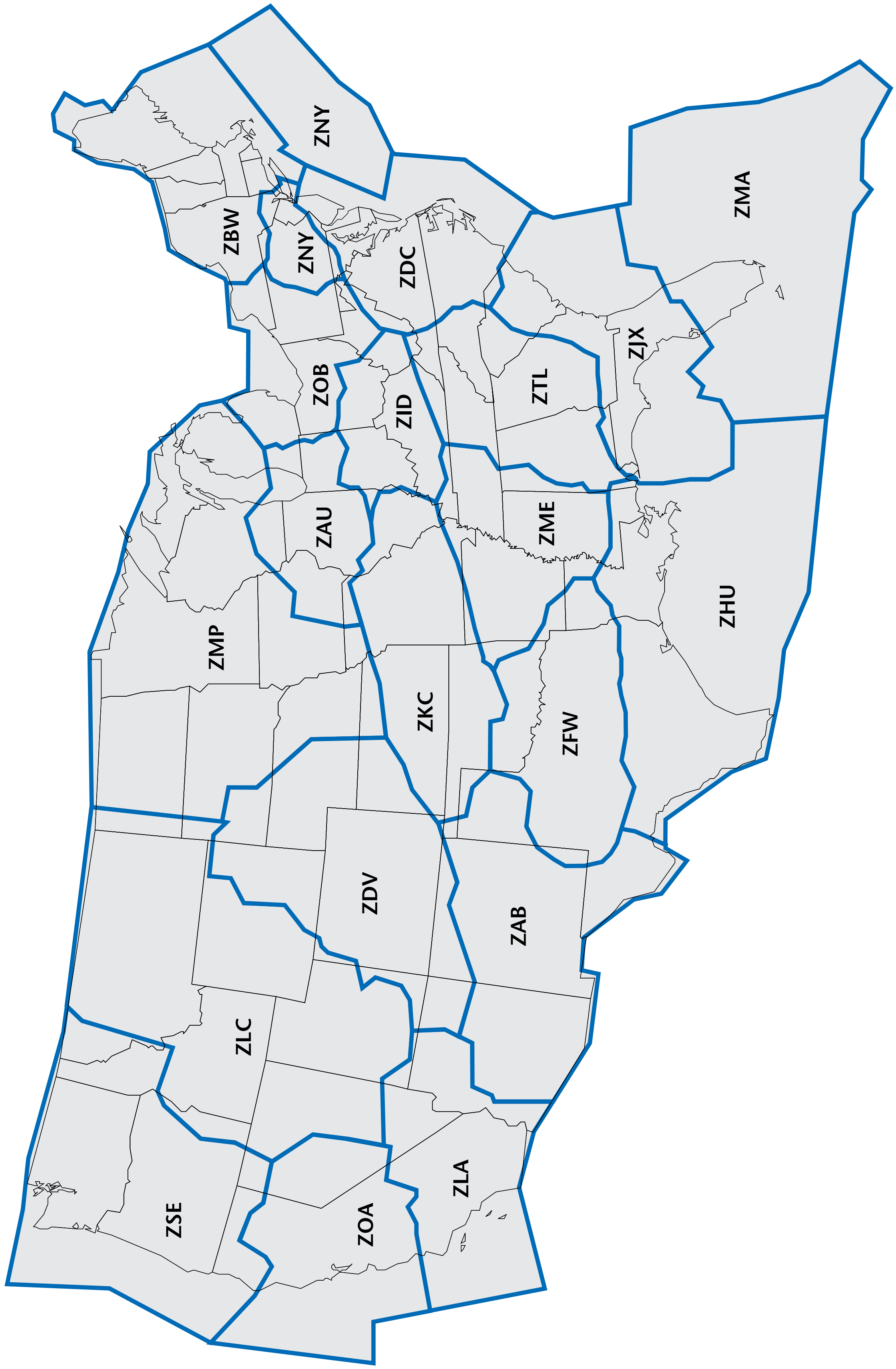


Figure 1-3. The 20 Continental U.S. Air Route Traffic Control Centers

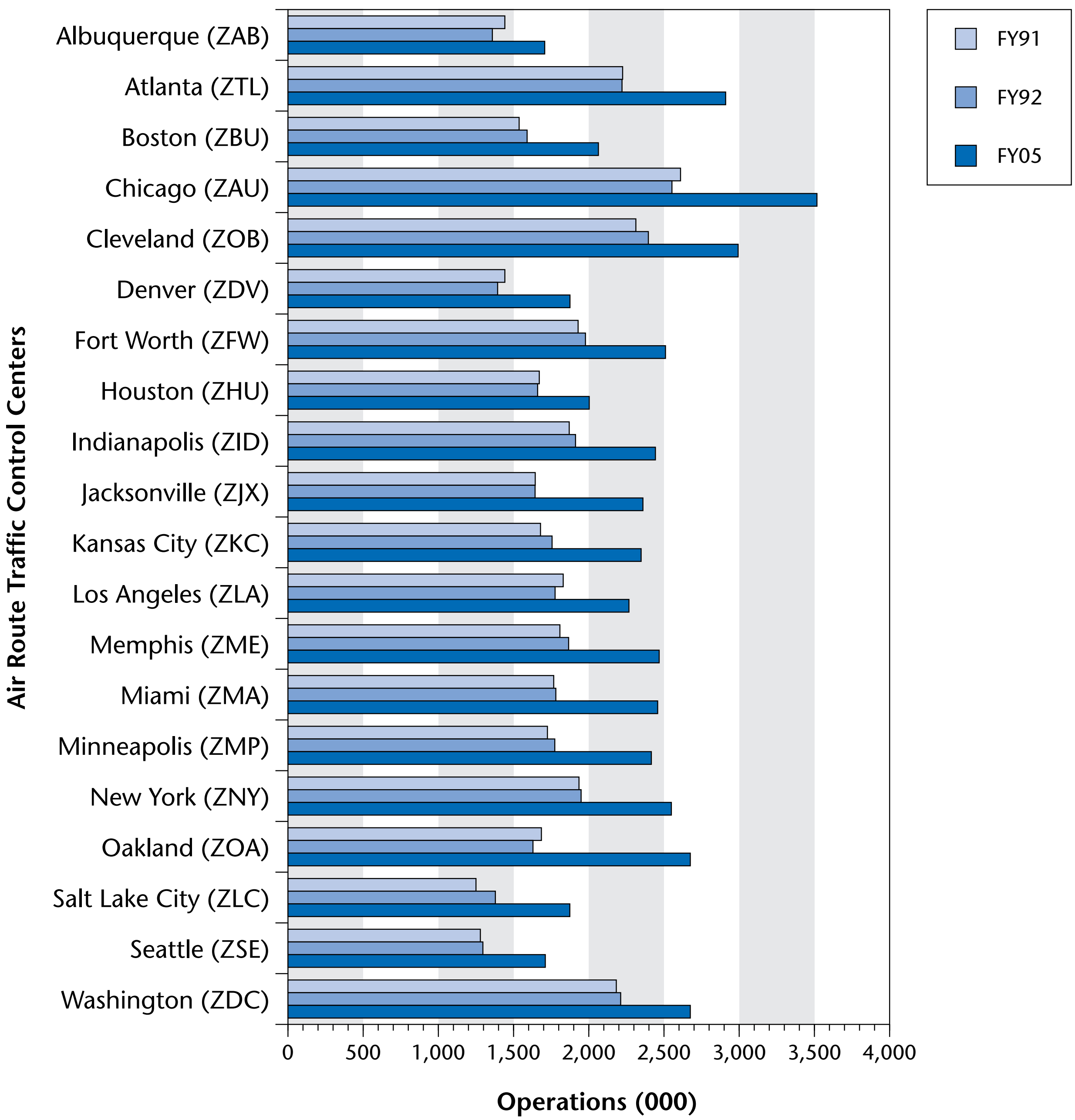


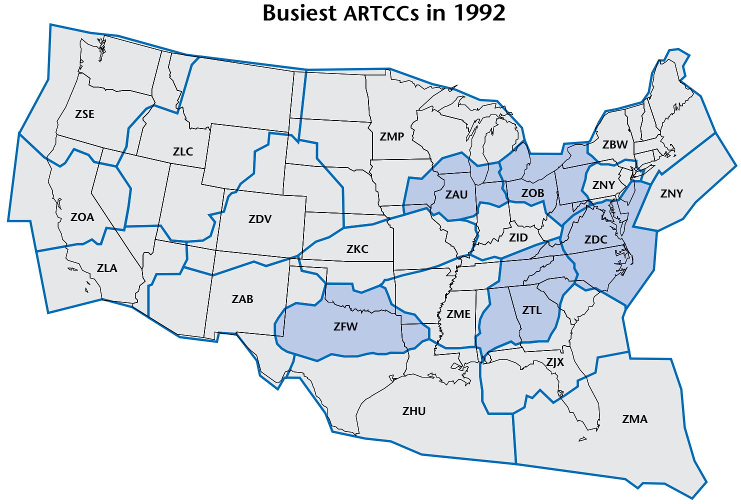
Figure 1-4. Operations at Air Route Traffic Control Centers
Source: Forecast of IFR Aircraft Handled by ARTCC, FY92-FY05, FAA-APO-93-4, May 1993

The busiest ARTCCs in 1992 were: Chicago, Cleveland, Atlanta, Washington, and Fort Worth. Forecasts for 2005 indicate a change in ranking of the busiest ARTCCs to: Chicago, Cleveland, Atlanta, Oakland, and Washington. The centers with the highest average annual growth rates are Oakland and Jacksonville, which are projected to grow by 3.9 and 2.8 percent respectively. The relatively high growth at these two centers reflects the projected high growth of domestic traffic demand in the West and South. Oakland Center is forecast to experience the largest absolute growth, from 1.6 million aircraft operations in 1992 to 2.7 million in the year 2005, a 64 percent increase. This reflects the continuing development and strong projected growth on trans-Pacific routes.

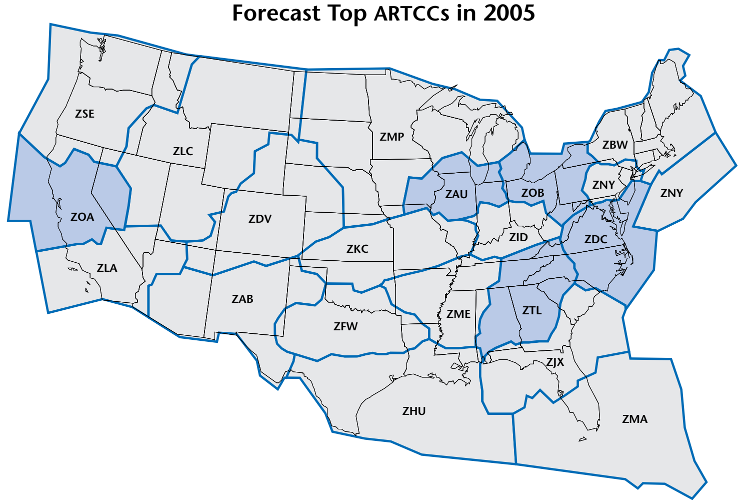
The busiest ARTCCs in 1992 were:
- Chicago,
- Cleveland,
- Atlanta,
- Washington, and
- Fort Worth.

Forecasts for 2005 indicate a change in ranking of the busiest ARTCCs to:
- Chicago,
- Cleveland,
- Atlanta,
- Oakland, and
- Washington.

Busiest ARTCCs in 1992



Forecast Top ARTCCs in 2005



1.4 Delay[8]

1.4.1 Sources of Delay Data

Delay can be thought of as another system performance parameter, an indicator that capacity is perhaps being reached and even exceeded. Currently, the FAA gathers delay data from two different sources. The first is through the Air Traffic Operations Management System (ATOMS), in which FAA personnel record aircraft that are delayed 15 or more minutes by specific cause (weather, terminal volume, center volume, closed runways or taxiways, and NAS equipment interruptions). Aircraft that are delayed by less than 15 minutes are not recorded in ATOMS.

The FAA gathers delay data from two different sources. The first is through the Air Traffic Operations Management System (ATOMS), and the second source of delay data is through the Airline Service Quality Performance (ASQP) data.

The second source of delay data is through the Airline Service Quality Performance (ASQP) data, which is collected, in general, from airlines with one percent or more of the total domestic scheduled service passenger revenue[9] and represents delay by phase of flight (i.e., gate-hold, taxi-out, airborne, or taxi-in delays). Actual departure time, flight duration, and arrival times are reported along with the differences between these and the equivalent data published in the *Official Airline Guide* (OAG) and entered in the Computer Reservation System (CRS). ASQP delays range from 0 minutes to greater than 15 minutes. In the discussion that follows, "delay by cause" refers to ATOMS data, and "delay by phase of flight" refers to ASQP data.

The delay data reported through ATOMS and ASQP are not without their problems. ATOMS is the official FAA delay reporting system. However, it only reports delays of 15 minutes or more; it aggregates flight delays, thus making it impossible to determine if a particular flight was delayed; and it only reports flight delays due to an air traffic problem (i.e., weather, terminal volume, center volume, closed runways or taxiways, and NAS equipment interruptions). ASQP only reports on carriers with at least 1 percent of domestic passenger enplanements for scheduled air carrier flights. ASQP is used primarily for consumer on-time performance reporting and is under DOT control.

8. Although no existing delay reporting system is fully comprehensive, this Plan aims to identify problem areas through available data, such as the following delay information and the previously mentioned aviation activity statistics.
9. Airlines reporting ASQP data as of November 1, 1993 include: Alaska, American, America West, Continental, Delta, Northwest, Southwest, TWA, United, and USAir.

The FAA is developing an improved aircraft delay data system to provide a single, integrated source of data to answer analytical questions about delay at a detailed level. This new system, the Consolidated Operations and Delay Analysis System (CODAS), will use Enhanced Traffic Management System (ETMS), OAG, ASQP, and Aeronautical Radio Incorportated (ARINC) Communications Addressing and Reporting System (ACARS) data to calculate delay by phase of flight and will include weather data from the National Oceanic and Atmospheric Administration (NOAA) for analysis purposes. By combining, comparing, and screening the data from these sources, a refined data source is created, which can be used for accurate delay calculations and model validation. CODAS will not replace ATOMS, which will continue to be the official FAA delay reporting system.

The FAA is developing an improved aircraft delay data system to provide a single, integrated source of data to answer analytical questions about delay at a detailed level.

1.4.2 Delay by Cause

Flight delays exceeding 15 or more minutes, as recorded by ATOMS, were experienced on 275,759 flights in 1993, a decrease of 1.8 percent over 1992. Weather was attributed as the primary cause of 72 percent of operations delayed by 15 minutes or more in 1993, up from 65 percent in 1992. Terminal air traffic volume accounted for 22 percent of delays of 15 or more minutes, down from 27 percent in 1992. Table 1-1 details these and other factors that caused delays of 15 minutes or more and provides a history of this breakdown of delay by primary cause. With the exception of the split between terminal and center volume delays, the basic distribution of delay by cause has remained fairly consistent over the past seven years.

Flight delays exceeding 15 or more minutes, as recorded by ATOMS, were experienced on 275,759 flights in 1993, a decrease of 1.8 percent over 1992.

More than half of all delays are attributed to adverse weather. These delays are largely the result of instrument approach procedures that are much more restrictive than the visual procedures in effect during better weather conditions. The FAA continues to install new and upgrade existing instrument landing systems (ILSs) to support continued operations during conditions of reduced visibility. During the past few years, the FAA has developed new, capacity-producing approach procedures that take advantage of improving technology while maintaining the current level of safety. These new procedures, and a corresponding estimate of the expected increase in the number of operations per hour, are discussed in Chapter 3.

1.4.3 Delay by Phase of Flight

Based on ASQP data, Table 1-2 presents the average delay in minutes by phase of flight. This table shows, for example, that more delays occur during the taxi-out phase than any other phase and that airborne delays average 4.1 minutes per aircraft. To put this in perspective, there were approximately 6,200,000 air carrier flights in 1992.[10] With an average airborne delay of 4.1 minutes per aircraft, this means that there was a total of over 424,000 hours of airborne delay that year, which, at an estimated $1,600 per hour, cost the airlines $678 million.

Table 1-1. Distribution of Delay Greater Than 15 Minutes by Cause

Distribution of Delay Greater than 15 Minutes by Cause								
Cause	**1986**	**1987**	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**
Weather	67%	67%	70%	57%	53%	66%	65%	72%
Terminal Volume	16%	11%	9%	29%	36%	27%	27%	21%
Center Volume	10%	13%	12%	8%	2%	0%	0%	0%
Closed Runways/Taxiways	3%	4%	5%	3%	4%	3%	3%	3%
NAS Equipment	3%	4%	3%	2%	2%	2%	2%	2%
Other	1%	1%	1%	1%	3%	2%	3%	2%
Total Operations Delayed (000s)	**418**	**356**	**338**	**394**	**393**	**298**	**281**	**276**
Percent Change from Previous Year	+25%	-15%	-5%	+17%	0%	-24%	-6%	-2%

10. *FAA Aviation Forecasts, Fiscal Years 1994–2005*, FAA–APO 94–1, March 1994.

Table 1-2. Average Delay by Phase of Flight[11]

Average Delay by Phase of Flight (minutes per flight)						
Phase	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**
Gate-hold	1.0	1.0	1.0	1.1	1.1	1.0
Taxi-out	6.8	7.0	7.2	6.9	6.9	6.9
Airborne	4.0	4.3	4.3	4.1	4.1	4.1
Taxi-in	2.1	2.2	2.3	2.2	2.2	2.2
Total	14.0	14.6	14.9	14.3	14.3	14.2
Mins./Op.	7.0	7.3	7.5	7.1	7.1	7.1

1.4.4 Identification of Delay-Problem Airports

In CY93, the number of airline flight delays of 15 minutes or more decreased compared to 1992 at 31 of the 55 airports. These delays ranged from nearly 88 per 1,000 operations at Newark to 0.1 per 1,000 at San Antonio.

In CY93, the number of airline flight delays of 15 minutes or more decreased compared to 1992 at 31 of the 55 airports at which the FAA collects air traffic delay statistics. Table 1-3 lists the number of operations delayed 15 minutes or more per 1,000 operations from 1990 to 1993 at 51 of these airports. These delays ranged from nearly 88 per 1,000 operations at Newark International Airport to 0.1 per 1,000 at San Antonio International Airport. Three of the top six airports in delays of 15 or more minutes were in the New York area. Table A-8 in Appendix A lists this same data for 22 of the 55 airports from 1985 to 1992.

11. **Gate-hold Delay:** The difference between the time that departure of an aircraft is authorized by ATC and the time that the aircraft would have left the gate area in the absence of an ATC gatehold.

    Taxi-out Delay: The difference between the time of lift-off and the time that the aircraft departed the gate, minus a standard taxi-out time established for a particular type of aircraft and airline at a specific airport.

    Airborne Delay: The difference between the time of lift-off from the origin airport and touchdown, minus the computer-generated optimum profile flight time for a particular flight, based on atmospheric conditions, aircraft loading, etc.

    Taxi-in Delay: The difference between touchdown time and gate arrival time, minus a standard taxi-in time for a particular type of aircraft and airline at a specific airport.

    Mins/op: Average delay in minutes per operation.

Table 1-3. Delays of 15 Minutes or More Per 1,000 Operations a the Top 100 Airports

Airport	ID	1990	1991	1992	1993
Newark Int'l.	EWR	84.90	67.30	83.50	87.90
Chicago O'Hare Int'l.	ORD	64.60	47.90	45.40	47.50
Boston Logan Int'l.	BOS	32.30	32.80	34.60	39.20
New York LaGuardia	LGA	86.80	61.60	55.20	38.30
Denver Stapleton Int'l.	DEN	28.90	28.40	26.30	37.90
New York Kennedy Int'l.	JFK	68.30	41.70	41.20	35.70
Dallas-Fort Worth Int'l.	DFW	32.00	35.30	29.80	33.70
San Francisco Int'l.	SFO	45.80	58.10	30.20	23.80
Atlanta Hartsfield Int'l.	ATL	44.10	22.10	29.90	23.30
St. Louis Lambert Int'l.	STL	25.20	29.90	15.00	19.50
Philadelphia Int'l.	PHL	35.40	16.90	18.50	18.80
Miami Int'l.	MIA	8.60	24.00	9.70	10.50
Washington National	DCA	9.60	5.60	11.00	9.30
Los Angeles Int'l.	LAX	7.10	14.80	19.80	9.20
Detroit Metropolitan	DTW	19.90	9.30	11.20	9.10
Houston Intercontinental	IAH	12.70	12.60	7.90	8.10
Minneapolis-St. Paul Int'l.	MSP	31.90	7.90	4.40	7.20
Pittsburgh Int'l.	PIT	8.60	5.00	8.00	6.90
Washington Dulles Int'l.	IAD	7.40	9.00	7.30	6.90
Seattle-Tacoma Int'l.	SEA	30.50	18.80	13.20	6.80
Greater Cincinnati Int'l.	CVG	11.20	5.30	5.90	6.40
Orlando Int'l.	MCO	7.30	6.40	9.00	4.70
Baltimore-Washington Int'l.	BWI	17.60	6.00	5.80	3.90
Salt Lake City Int'l.	SLC	3.20	3.70	5.10	3.90
Tampa Int'l.	TPA	4.80	2.90	4.30	3.90
San Diego Int'l.	SAN	6.40	10.20	3.00	3.90
Charlotte/Douglas Int'l.	CLT	12.60	9.70	6.20	3.80
Fort Lauderdale-Hollywood Int'l.	FLL	3.00	2.10	3.70	3.80
Houston William B. Hobby	HOU	4.60	5.00	2.70	3.50
Chicago Midway	MDW	7.10	2.10	2.10	3.00
Phoenix Sky Harbor Int'l.	PHX	9.90	6.70	8.20	2.90
Nashville Int'l.	BNA	1.70	3.90	2.90	2.70
Cleveland Hopkins Int'l.	CLE	4.70	2.00	1.60	2.40
Raleigh-Durham Int'l.	RDU	2.40	2.00	3.60	2.00
Portland Int'l.	PDX	1.30	1.40	1.80	1.90
Kansas City Int'l.	MCI	2.30	3.00	0.80	1.30
Ontario Int'l.	ONT	1.20	1.60	1.30	1.20
Memphis Int'l.	MEM	3.00	2.40	1.10	1.00
Bradley Int'l.	BDL	3.80	2.40	2.00	0.90
Palm Beach Int'l.	PBI	1.40	1.50	1.00	0.80
Anchorage Int'l.	ANC	2.00	1.30	0.30	0.70
Indianapolis Int'l.	IND	0.80	1.00	2.10	0.60
Las Vegas McCarran Int'l.	LAS	1.20	0.40	0.30	0.50
San Jose Int'l.	SJC	11.10	4.30	1.70	0.40
Albuquerque Int'l.	ABQ	1.00	0.70	0.70	0.30
New Orleans Int'l.	MSY	2.00	1.10	0.60	0.30
San Juan Luis Muñoz Marín Int'l.	SJU	0.40	0.10	0.60	0.30
Dayton Int'l.	DAY	1.50	1.10	0.30	0.30
Honolulu Int'l.	HNL	0.40	0.40	0.10	0.20
San Antonio Int'l.	SAT	0.80	0.30	0.20	0.10
Kahului	OGG	0.20	0.10	0.10	0.00

1.4.5 Identification of Forecast Delay-Problem Airports

Forecasts indicate that, without capacity improvements, delays in the system will continue to grow. In 1993, 23 airports each exceeded 20,000 hours of annual aircraft flight delays. Assuming no improvements in airport capacity are made, 32 airports are forecast to each exceed 20,000 hours of annual aircraft flight delays by the year 2003. Table 1-4 lists the airports with 1993 actual and 2003 forecast air carrier delay hours in excess of 20,000 hours. The current forecast for 32 delay-problem airports in 2003 is eight less than the 40 airports predicted in the forecast of three years ago. This reflects the overall decline in air travel as a result of the recession, and an economic recovery that has been slower than expected.

Figure 1-5 shows the airports exceeding 20,000 hours of annual aircraft delay in 1993 and the airports forecast to exceed 20,000 hours of annual aircraft delay in 2003, assuming there are no capacity improvements.

Table 1-4. 1993 Actual and 2003 Forecast Air Carrier Delay Hours

Annual Aircraft Delay in Excess of 20,000 Hours					
1993		2003			
Atlanta Hartsfield	ATL	Atlanta Hartsfield	ATL	New York La Guardia	LGA
Boston Logan	BOS	Nashville	BNA	Orlando	MCO
Charlotte/Douglas	CLT	Boston	BOS	Memphis	MEM
Washington National	DCA	Baltimore Washington	BWI	Miami	MIA
Denver Stapleton	DEN	Charlotte-Douglas	CLT	Minneapolis-Saint Paul	MSP
Dallas-Ft. Worth	DFW	Cincinnati	CVG	Ontario	ONT
Detroit	DTW	Washington National	DCA	Chicago O'Hare	ORD
Newark	EWR	Dallas-Ft. Worth	DFW	Philadelphia	PHL
Honolulu	HNL	Detroit	DTW	Phoenix	PHX
Houston Intercont'l	IAH	Newark	EWR	Pittsburgh	PIT
New York John F. Kennedy	JFK	Honolulu	HNL	Raleigh-Durham	RDU
Los Angeles	LAX	Washington Dulles	IAD	San Diego	SAN
New York La Guardia	LGA	Houston Intercont'l	IAH	Seattle-Tacoma	SEA
Orlando	MCO	New York John F. Kennedy	JFK	San Francisco	SFO
Miami	MIA	Las Vegas	LAS	Salt Lake City	SLC
Minneapolis-Saint Paul	MSP	Los Angeles	LAX	St. Louis	STL
Chicago O'Hare	ORD				
Philadelphia	PHL				
Phoenix	PHX				
Pittsburgh	PIT				
Seattle-Tacoma	SEA				
San Francisco	SFO				
St. Louis	STL				

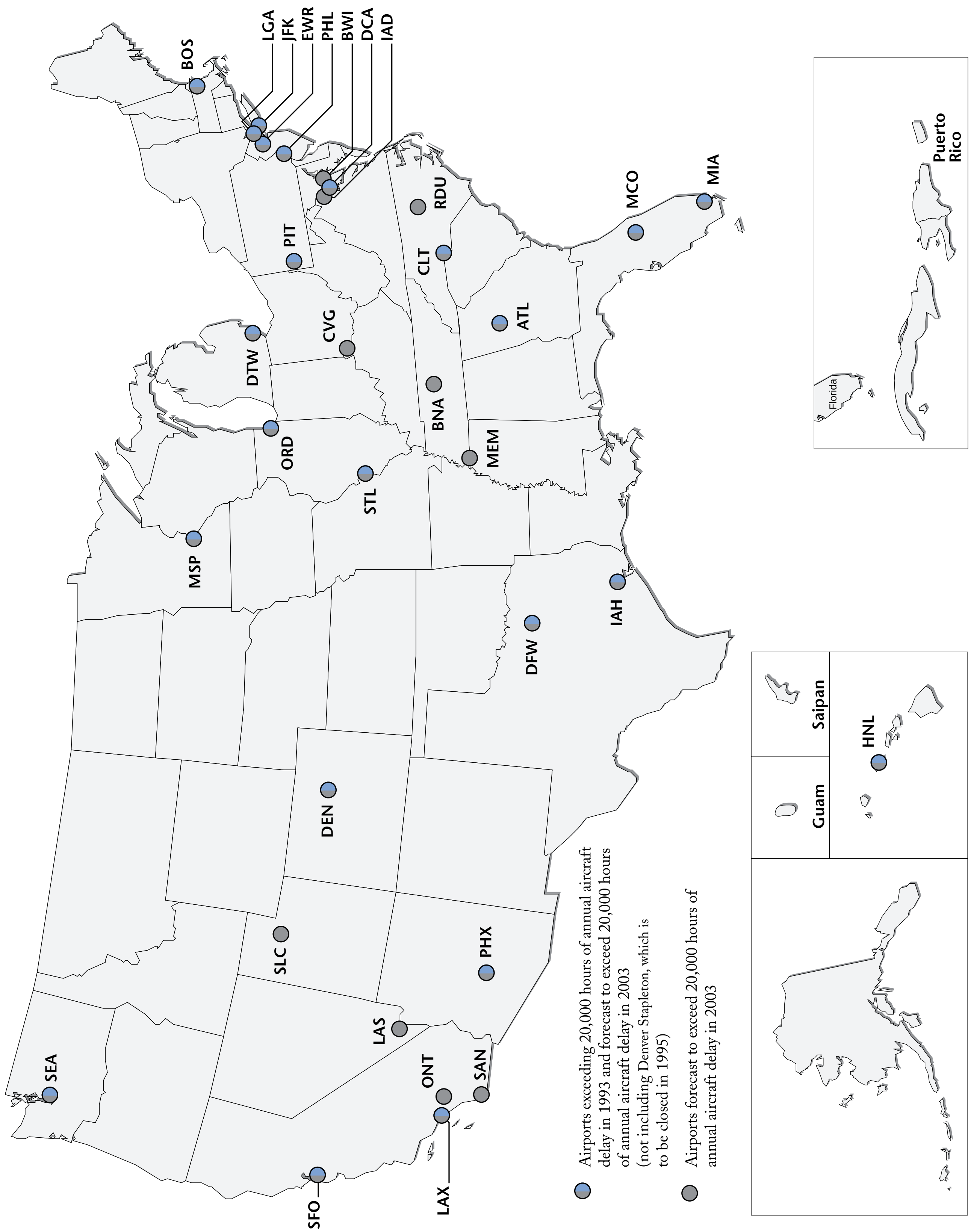


Figure 1-5. Airports Exceeding 20,000 Hours of Annual Delay in 1993 and 2003, Assuming No Capacity Improvements

Source: FAA Office of Policy and Plans

1.5 The FAA Strategic Plan and the FAA Operational Concept — A Vision for the Year 2010

A vigorous aviation system is essential for United States economic prosperity, and the entire aviation community must work together in order to maintain what has become the safest, most efficient, and most responsive aviation system in the world. To support this effort, the FAA developed the FAA Strategic Plan and the FAA Operational Concept. The two documents are a foundation for an iterative process to develop, in cooperation with all the users of the national aviation system, a common vision of the future from which to set policies, strategies, and operational goals for the year 2010.

The challenge for the year 2010 will be to ensure that flights are conducted with unprecedented levels of safety, security, and efficiency, while conserving natural resources and minimizing the effects on the environment.

In the year 2010, more people will be flying, more often, to more places than ever before. U.S. domestic passenger enplanements will double, and commuter and regional enplanements will triple. U.S. airlines will carry more than one billion passengers annually. Operations by general aviation aircraft will increase by 44 percent to 43 million flight hours annually. World revenue passenger miles will increase by 200 percent to reach 3.2 trillion. Larger aircraft sizes and higher load factors will combine to prevent even larger increases. Global air cargo revenue ton miles will grow by 136 percent reaching 130 billion. Helicopters and new tiltrotor and tiltwing aircraft will play an increasingly important role in providing short-haul and medium-range passenger service. The market for new aircraft over the next 20 years will be almost one trillion dollars, more than double the market over the past 20 years. The challenge for the year 2010 will be to ensure that flights are conducted with unprecedented levels of safety, security, and efficiency, while conserving natural resources and minimizing the effects on the environment.

1.5.1 System Capacity Goals and Objectives

The FAA Strategic Plan identifies System Capacity as one of seven strategic issue areas.

The general goal of the system capacity program is to build aviation system capacity that will minimize delays and allow fair access for all types of aviation.

The FAA Strategic Plan identifies System Capacity as one of seven strategic issue areas. The principal goals for the aviation system capacity program in Volume II of the FAA Strategic Plan are to ensure that:

- Airspace, airport, and airside capacity continue to grow to meet user needs cost effectively.
- Capacity resources are fully utilized to meet traffic demand and eliminate capacity-related delays.
- Airport capacities in instrument meteorological conditions (IMC) equal capacities in visual meteorological conditions (VMC).

Specific objectives have been developed in the FAA Strategic Plan to support the general goal of the system capacity program to build aviation system capacity that will minimize delays and allow fair access for all types of aviation. The FAA Operational Concept, in turn, lays out specific milestones the FAA will complete over the next five years to achieve these objectives.

- System Capacity Measurement — to identify and define, in concert with the aviation community, standards of success and national capacity indicators that will better target areas for reducing delay and increasing capacity.
- Near-Term Capacity Initiatives — to reduce constraints/ limitations at the top 40 delay/operationally impacted airports by timely implementation of system enhancements and capacity increasing technologies and procedures.
- ATC Automation — to improve the automated infrastructure through replacement and enhancements in order to provide the platform for capacity-enhancing technologies and procedures.
- Traffic Flow Management — to create the necessary capabilities that will permit the ATC system to ensure safe separation while imposing minimum constraints on system users and aircraft movement.
- Oceanic Control — to change, in concert with the international aviation community, oceanic air traffic control from its current non-radar control to a tactical control environment much like current domestic radar control.
- Weather Forecasting, Detection, and Communication — to reduce the capacity-impacting consequences of

weather phenomena by improved weather forecasts and increased accuracy, resolution, and dissemination of observations both on the ground and in the air.

- Communications, Navigation, and Surveillance (CNS) and Satellite Navigation — to implement CNS and satellite navigation capabilities through an aggressive industry/government partnership that achieves user benefits in all phases of aviation operations.
- Communications/Data Link — to provide a cost-effective communications infrastructure to enhance the safety and effectiveness of air traffic management operations.
- Airport Planning — to improve the national airport planning process by adding a method for prioritizing projects; by linking the national plan to the grant program through an Airport Capital Improvement Program; and by developing the Airport Research, Engineering, and Development (RE&D) program.
- Human Factors — to implement new automation technologies and associated functional improvements in a manner that fully accounts for the proper role of the human in the system.